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K sistematike roda Svetlovia (Oligochaeta, Tubificidae) iz ozera Baikal

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A contribution to the systematics of the genus Svetlovia (Oligochaeta, Tubificidae) from Lake Baikal

L. N. Snimshchikova

A new species of the endemic genus Svetlovia from the Northern Baikal is described. Information is presented on the distribution of two other species of this genus in the Northern Baikal. Cases are considered of the displacement of the genital system by several segments, forwards or backwards, in the "lower" Tubificidae. In connection with this it is proposed that the diagnosis of the genus Rhyacodrilus Bretscher, 1901, be defined more precisely with respect to the arrangement of the organs of the reproductive system. A diagnosis of the genus Svetlovia Čekanovskaja, 1975, and a key to the species of this genus are presented.

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Representatives of oligochaetes of the family Tubificidae, belonging to a new, third species of the genus Svetlovia Čekanovskaja, 1975, have been found in the Northern Baikal. A description of the species is presented. In addition, numerous new finds of the type species of this genus, S. maculata, and data on the other two species of this genus have allowed us to give a diagnosis of the genus Svetlovia, since this was not actually given by the author of the genus, and also an anomalous positioning of the genital system has been fortuitously noted for the type species. The finding in the Northern Baikal of individuals of the species Rhyacodrilus isossimovi Čekanovskaja, 1975, with a forwardly displaced genital system, as in the holotype of S. maculata, and a consideration of similar cases known in the literature allow us to modify the diagnosis of the genus Rhyacodrilus Bretscher, 1901, which was formerly characterized by an inconstant positioning of the genital system.

Svetlovia golyschkinae Snimstschikova, sp. n.
(Figure, A - Zh)

Material. Northern Baikal, near Yarki Island, depth 53 m, silt with detritus, 8 July 1975, 7 specimens, of which 2 sexually mature - holotype and paratype. All specimens incomplete, composed of 15 - 21 segments, length up to 5 mm, thickness in region of clitellum about 1 mm. Preserved in the collection of the Limnological Institute of the Siberian Department of the Academy of Sciences of the USSR.

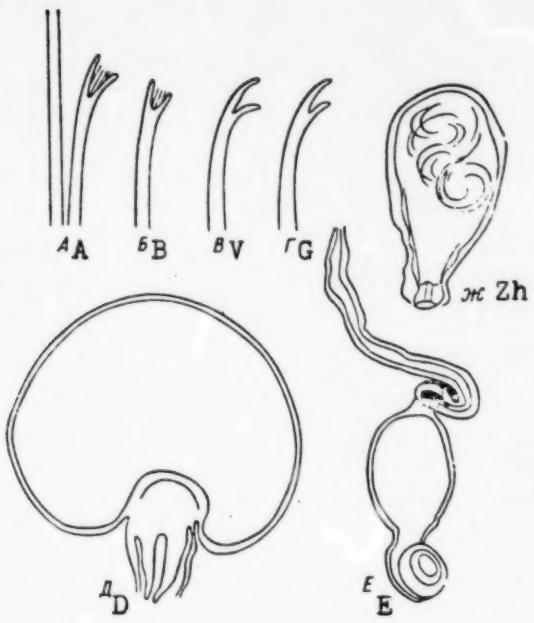
Description. Prostomium blunt, rounded, prolobous, its length is about half of its width at the base. Intersegmental furrows shallow, segments II - VII bi-annulate with a

narrow anterior ring. Integument of body opaque, cuticle granular.

Ventral setae bidentate, slender, curved in an S-shaped fashion, with a node situated almost medially, closer to the distal end. In the ventral bundles on the anterior part of the body there are 5 - 6 setae from 87 μ in length on segments II - III up to 134 μ on segment VI. Setae with a longer and more curved distal tooth; in thickness the two teeth are approximately equal. There are 3 setae per bundle on the postclitellar segments, 122 μ in length; they are slightly thicker than the setae on the anterior segments; their teeth are shorter and less curved, distal tooth twice as long and a little thicker than the proximal tooth (see Figure).

In the dorsal bundles there are trichoid and flabellate setae. The trichoid setae are smooth, up to 350 μ in length, 4 - 5 per bundle on the anterior segments and 2 - 3 in the bundles on the postclitellar segments. 4 - 5 flabellate setae per bundle on the anterior segments, 87 - 122 μ in length, with marginal teeth, equal in length, and several interstitial denticles. In each bundle on the postclitellar segments there are 3 setae up to 105 μ in length, with marginal teeth that are half as long as in the setae on the anterior part of the body. Spermathecal and penial setae not found. 1149

In the body cavity large coelomocytes are present. Clitellum annular, it occupies segment X and half of segment XI. Openings of spermathecae on segment X beside the 9/10 intersegmental groove, just slightly lateral to the line of the ventral setae. Male genital openings on segment XI, along the same line as the spermathecal openings. Seminal funnels not



Детали строения *Svetlovia golyschkinae* sp. n.: *А*—дистальный конец веерной щетинки и фрагмент волосной щетинки II сегмента, *Б* — дистальный конец веерной щетинки X сегмента, *В* — дистальный конец брюшной двузубчатой щетинки III сегмента, *Г* — дистальный конец брюшной щетинки постклителлярного сегмента, *Д* — семеприемник, *Е* — мужской гонодукт, *Ж* — брюшно-мозговая железа

Structural details of Svetlovia golyschkinae sp. n.:

A - distal end of flabellate seta and fragment of tricoid seta on segment II,
B - distal end of flabellate seta on segment X,
V - distal end of ventral bidentate seta on segment III,
G - distal end of ventral seta on postclitellar segment,
D - spermatheca,
E - male gonoduct,
Zh - ventral-cord gland.

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studied. Vasa deferentia not very coiled, 490 μ in length, of uniform diameter - 35 μ - along their entire length, they run into the atria apically. Atria in segment IX, of ovate or ellipsoidal form, in their distal part they gradually pass into the short ejaculatory ducts terminating in the penes. Length of ampulla of atrium 192 μ, maximal diameter 140 μ, length of ectal section - 105 μ. No separate or diffuse prostate gland

present. Ventral-cord glands of sacculate form (see Figure, Zh) present in segments Vi - IX. Spermathecae in segment X with a very large spherical ampulla and a short, distinct ectal section. Length of spermatheca together with ectal section - 460 μ. Maximal diameter of ampulla of spermatheca - 476 μ, diameter of ectal section - 106 μ. Sperm not formed into spermatozeugmas, amorphous. 1150

Species named in honour of Raisa Alekseevna Golyshkina, Senior Lecturer at Irkutsk University.

Differential diagnosis. At the present time the Baikal endemic genus Svetlovia includes three species with different ecological characteristics: S. maculata Čekanovskaja, which is widely distributed in the Baikal, and two species that have a restricted distribution, S. majusculata Snimstschikova, 1982, and S. golyschkinae sp. n. S. maculata and S. golyschkinae are differentiated by the structure of the dorsal setae, by the absence of penial setae in S. golyschkinae, and by the structure of the vas deferens and spermatheca. These two species are similar in the structure of the ventral setae and the form of the atrium.

S. majusculata and S. golyschkinae are differentiated by the structure of the dorsal and ventral setae, by the structure and character of the junction of the vas deferens into the atrium, and by the form of the atrium; they are similar in the absence of the penial setae and in the structure of the vas deferens.

Chekanovskaya described S. maculata on the basis of one specimen, found in Lake Baikal on a silty substrate at a depth of 680 m. In the diagnosis of the genus and the species

Chekanovskaya (1975) presents the disposition of the reproductive organs in segments IX - X as one of the distinguishing characteristics of S. maculata, i.e. the genital organs are displaced by one segment forwards in comparison with their usual position in the Tubificidae. At the same time the indication of the position of the atrium in segment XI is not in accord with the disposition of the genital system in segments IX - X.

We have more than 700 specimens of this species, of which 72 are sexually mature. In all of the examined specimens the spermathecae are situated in segment X, while the vasa deferentia and atria are in segment XI, i.e. as is normally the case in the majority of the Tubificidae. Furthermore, two new species of the genus Svetlovia have been described. The disposition of the genital organs in these species is also normal (segments X - XI).

As has already been stated, the description of the species was made on the basis of a single specimen. By chance, this particular single specimen proved to have a reproductive system with anteriorly displaced organs. In the Northern Baikal we have found a similar occurrence in Rhyacodrilus isossimovi Čekanovskaja, 1975. Out of 150 specimens of R. isossimovi 2 specimens were found with a genital system that was displaced forward by one segment. All of the remaining features corresponded to the description of the species.

A fair amount of information is present in the literature on the displacement of the genital organs by a few segments forwards or backwards in the lower Tubificidae (see Sokol'skaya, 1968; Timm, 1979, and others). Sokol'skaya

(1968) found several specimens of Rhyacodrilus coccineus (Vejdovsky, 1875) which were differentiated from the normal forms by the displacement of the genital system anteriorly by one or two segments. Sokol'skaya showed that such deviations from the norm are anomalies, arising as a result of regeneration, and have no taxonomic significance. Timm (1979) also presented data which showed that the displacement of the genital system is a common phenomenon in oligochaetes, reproducing in an asexual fashion.

It is known that asexual reproduction and regeneration are closely interrelated with one another, being manifested in the family Tubificidae in the form of architomy - fission with subsequent reorganization. Hrabê (1981) asserts that with architomic reproduction testes are formed in segment I, arising with the regeneration of the anterior end, similarly to paratomy in the Naididae, i.e. individuals with a regenerating anterior end are characterized by a forward displacement of the genital system by a few segments; this depends on the number of larval segments in a given species. Such a displacement is not inherited: individuals of Lumbriculus variegatus and Bothrioneurum vejdovskyanum which emerge from cocoons and 1151
do not regenerate prior to maturation have genital organs in segments typical of their family.

Yanda (cited by Stolte, 1955) established experimentally that the regeneration of the genital apparatus in Criodrilus lacuum Hoffmeister, 1845 (a secondarily aquatic form with a clearly expressed regeneration capacity, of the family Criodrilidae) proceeds along completely different ways at low and high temperatures, with excess and deficiency of oxygen, and in a

weak solution of NaCl. At the same time the developing genital organs may be displaced by a few segments forwards or backwards. Thus, regeneration, a phenomenon that occurs frequently in oligochaetes, depends on the environmental conditions and, when the latter change, it may proceed with a deviation from the norm.

At the present time not a single species is known of the genus Rhyacodrilus or the genus Svetlovia in which a disposition of the genital system outside segments X - XI would be a constant feature. The phenomenon of the displacement of the genital system forwards or backwards by a few segments is found only in a few individual specimens and is not inherited. For this reason we propose to clarify the diagnosis of the genus Rhyacodrilus with respect to the disposition of the genital system. Although R. riabuschinskii Michaelsen, 1929, with genital organs in segments VIII - IX, has been reduced to a synonym of R. coccineus (Vejdovsky, 1875) (Sokol'skaya, 1968), the diagnosis of the genus remained as before (Chekanovskaya, 1962, 1972), the disposition of the genital system in the species of the genus was considered to be inconstant and was shown either in segments VIII - IX or in segments X - XI.

RHYACODRILUS Bretscher, 1901

Type species Rhyacodrilus coccineus (Vejdovsky).

In the ventral bundles the setae are bidentate (rarely monodentate), in the dorsal bundles they are bidentate or flabellate; in most species trichoid setae are also present. The penial setae are differentiated from the ventral setae by their form and dimensions.

Within the body cavity are present large, granular coelomic corpuscles. Testes in segment X, ovaries in XI. Vasa deferentia well developed, but they are never very long. Atria in segment XI, of various forms, from spherical to tubular. There is no separate prostate gland, the wall of the atrium is covered externally by a layer of prostate cells (diffuse prostate gland). Male genital openings on segment XI, spermathecal openings on segment X. Spermathecae in segment X of a round or elongated form. Sperm not formed into spermatozeugmas, amorphous. Displacements often occur in the disposition of the genital system by several segments forwards or backwards.

The diagnosis of the genus Svetlovia was compiled on the basis of materials which allowed us to clarify the description of the type species S. maculata, in which an anomalous disposition of the genital system was initially indicated, and from data on two other species of the genus. A diagnosis of this genus was not formulated by its author (Chekanovskaya, 1975), but only differences were presented between Svetlovia and other genera of the Tubificidae.

SVETLOVIA Čekanovskaja, 1975

Type species Svetlovia maculata Čekanovskaja.

In the dorsal bundles the setae are bidentate and trichoid, in the ventral bundles they are bidentate, they may have 1 - 2 interstitial denticles. Penial setae present (monodentate) or absent. Large coelomocytes present in the body cavity. Fairly large spherical or sacciform glands extend

from the ventral nerve cord in segments IV - IX. They are situated dorsally to the ventral cord and are either closely abutted to the latter, protruding deeply into the body cavity, or they are surrounded by this cavity and are connected by a stalk to the ventral cord. 1152

Normally testes in segment X, ovaries in segment XI, spermathecal openings on segment X, male genital openings on segment XI. Vasa deferentia short, not very coiled, of uniform thickness along their entire length or becoming gradually thicker towards their distal end. Atria in segment XI of a round, ovate or ellipsoidal form, terminating distally in a short ejaculatory duct and penis. No separate or diffuse prostate gland. Outer surface of ampulla of atrium smooth, internally in its proximal part it is lined with fairly large glandular cells. Spermathecae in segment X of spherical form, with a short distal ectal duct, or of sacculate form with a transverse constriction, dividing it into two sections. Sperm not formed into spermatozeugmas, amorphous.

In some individuals a forward displacement of the genital system may occur, caused by regeneration of the anterior end. The capacity for regeneration, together with the distinctive features presented by Chekanovskaya (1975) (form of atrium, absence of typical prostate cells and of a separate prostate gland, sperm not formed into spermatozeugmas), place the genus Svetlovia close to the "lower" Tubificidae.

Key to species of the genus Svetlovia

1 (2). Dorsal setae trichoid and bidentate. Ventral setae bidentate, with distal tooth markedly longer than proximal tooth. Penial setae monodentate, with a curved distal end, 5 in a bundle. Spermathecae with a sacciform ampulla, divided by a transverse constriction into 2 sections: a smaller proximal section, which is thin-walled with a weakly developed muscle layer, and a large distal section with thick muscular walls, forming several pockets. The vasa deferentia become gradually thicker towards their distal end, they pass into the atria apically. Atria of ellipsoidal form . . . . . S. maculata Čekanovskaja

2 (1). Dorsal setae trichoid and flabellate. No penial setae. Spermathecae with a spherical ampulla and a short, distinct ectal section 3

3 (4). Trichoid setae plumose. Flabellate setae with short marginal teeth and 3-4 interstitial denticles. Ventral setae bidentate, with distal tooth longer and more slender than proximal tooth, with 1-2 interstitial denticles. Spermathecae with ampulla 350 μ in diameter. Vasa deferentia becoming gradually thicker, they pass into the atria laterally. Atria round in form . . . . . S. majusculata Snimstschikova

4 (3). Trichoid setae smooth. Flabellate setae with marginal teeth of uniform length and several interstitial denticles. Ventral setae bidentate, with a longer distal tooth. Spermathecae with ampulla 476 m in diameter.

Vasa deferentia of uniform thickness along their entire length, they pass into the atria apically.
Atria ovate or ellipsoidal in form . . . . . .
. . . . . S. golyschkinae sp. n.

S. maculata was described on the basis of a specimen from a depth of 680 m, it is distributed throughout the whole area of the Northern Baikal at a depth of from 15 to 430 m, and is confined mainly to silty bottoms with an admixture of detritus. Only in three cases have we found it in coarse sand, pebbles and gravel (depth 20 - 50 m). Maximal population density 520 specimens / m^2, usually 10 - 100 specimens / m^2. Akinshina and Lezinskaya (1980) have recorded this species in the Southern Baikal (Utulik - Murino region) at depths of 50 - 100 m.

S. majusculata was found by Snimshchikova (1982) in the Northern Baikal, at the mouth of the Kichera river at a depth of 32 m on silt with detritus (two sexually mature specimens). 1153

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ON THE TAXONOMY OF THE GENUS *SVETLOVIA* (OLIGOCHAETA, TUBIFICIDAE) FROM THE BAIKAL LAKE

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Summary

Svetlovia golyschkinae sp. n. is described from the Baikal Lake. The data are provided on the distribution of two other species of this endemic genus, *S. maculata* and *S. majusculata*, in the Baikal Lake. Cases of displacement of the genital system by a few segments forwards or backwards are considered in the Tubificidae. In this respect, it is proposed to make more precise the diagnosis of the genus *Rhyacodrilus* Bretscher, 1901 as to the position of the genital system. A diagnosis of the genus *Svetlovia* Čekanovskaja, 1975 and a key to species of this genus are given.

Translator's note.

Snimshchikova - Snimstschikova and Chekanovskaya - Čekanovskaja. These are alternative transliterations of the same Russian names. The first versions are according to the British-American Standard system, the second are the authors' own versions.